

REMARKS

This is a full and timely response to the outstanding non-final Office Action mailed October 2, 2006. The Examiner is thanked for the thorough examination of the present application and the indication that claims 12 and 18 define allowable subject matter. Upon entry of this response, claims 1-18 remain pending in the present application.

The Office Action set forth the following, various rejections:

- (1) First, claims 1-18 are rejected under 35 U.S.C. §101 as allegedly being directed to non-statutory subject matter.
- (2) Claim 1 is rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Ewins (U.S. Pub. No. 2002/0126133, hereinafter "*Ewins*"), in view of Ewins ("*Mip-Map Level Selection for Texture Mapping*"; IEEE Transactions on Visualization and Computer Graphics, Oct-Dec 1998, p. 317-319).
- (3) Claims 2-3, 6-8, 10 and 13 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over *Ewins*, in view of *Ewins*, further in view of Rosman et al. (U.S. Pat. No. 6,184,894, hereinafter "*Rosman*").
- (4) Claims 9 and 11 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over *Ewins*, in view of *Ewins*, further in view of Van Hook et al. (U.S. Pat. No. 6,353,438, hereinafter "*Van Hook*").
- (5) Claims 4 and 5 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over *Ewins*, in view of *Ewins*, further in view of *Rosman*, further in view of Barenburg et al. (U.S. Pub. No. 2005/0128213, hereinafter "*Barenburg*").

- (6) Claims 14 and 16 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over *Ewins*, in view of *Ewins*, further in view of *Rosman*, further in view of Lin et al. (U.S. Pat. No. 5,740,344, hereinafter "*Lin*").
- (7) Claim 15 is rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over *Ewins*, in view of *Ewins*, further in view of *Rosman*, further in view of Spangler (U.S. Pub. No. 2004/0119720, hereinafter "*Spangler*").
- (8) Finally, claim 17 is rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over *Ewins*, in view of *Ewins*, further in view of *Rosman*, further in view of Lin, further in view of Burrell (U.S. Pub. No. 2001/0048443, hereinafter "*Burrell*").

Applicants respectfully request consideration of the following remarks contained herein. Reconsideration and allowance of the application and presently pending claims are respectfully requested.

I. Response to Claim Rejections Under 35 U.S.C. § 101

Claims 1-18 stand rejected under 35 U.S.C. §101 as allegedly being directed to non-statutory subject matter. Specifically, the Office Action states that "claim 1 lacks the practical application of producing a useful, concrete and tangible result." The Office Action goes on to state that "claim 1 recites mapping a target pixel and performing a filtering function to simulate filtering effect. Thus, there is no tangible, concrete, useful result in said claim." (Office Action, pg. 2) Applicants respectfully disagree.

First, Applicants have amended claim 1 to clarify certain aspects of the claimed embodiments and submit that no new subject matter is added. Contrary to the Examiner's assertions, claim 1 does produce a useful, concrete and tangible result. The claimed embodiments use only one level of a mip-map to perform filtering functions. Using one level instead of two levels avoids the need to load another level of texels into the cache memory. This would otherwise require an additional memory cycle. In addition, the cache hit rate is improved in the claimed embodiments. Therefore, the Applicants respectfully submit that the 35 U.S.C. §101 rejections to claims 1-18 should be withdrawn.

II. Response to Claim Rejections Under 35 U.S.C. § 103

Claims 1-18 stand rejected under 35 U.S.C. §103(a). For at least the reasons set forth below, Applicants traverse these rejections.

Independent Claim 1 is Patentable Over Ewins in View of Ewins

Applicants respectfully submit that independent claim 1 patently defines over the combination of *Ewins* and *Ewins* for at least the reason that the combination fails to disclose, teach or suggest certain features in claim 1.

Claim 1, as amended, recites:

1. A method of performing anisotropic mip-mapping, comprising:
mapping a target pixel needing texture to one or more texels in a higher resolution texture array, ***a region of support in the higher resolution texture array being defined by a long and a short axis*** and being generally elliptical and a level of detail being derived from the short axis; and
performing a filtering function along an axis using the texels from the higher resolution texture array ***to simulate*** a filtering effect of using texels from the higher resolution texture array and a second texel array having a lower

resolution **wherein only one level of texture level is stored and used to generate the lower resolution texture array.**

(*Emphasis added.*) Claim 1 patently defines over the cited art for at least the reasons that the cited art fails to disclose the features emphasized above.

The Office Action alleges that “*Ewins* (‘133) teaches mapping a target pixel needing texture in a texture array, a region of support in the texture array being defined by a long and a short axis and being generally elliptical and a level of detail being derived from the short axis. (p. 1 paragraph 17 – p. 2 paragraph 23, p. 2-3 paragraphs 35-41, Fig. 1A)” (Office Action, pg. 2-3) The Office Action also states the following: “*Ewins* (‘133) does not explicitly teach texture minification involves a higher resolution texture array and performing a filtering function using texels from higher resolution texture array to simulate a filtering effect of using texels from higher resolution texture array and a second texel array having lower resolution. This is what *Ewins* teaches (p. 318, Section 1.1)” (Office Action, pg. 3)

Applicants respectfully disagree. However, in the interest of furthering the prosecution of the present application, Applicants have amended claim 1 to clarify certain aspects of the claimed embodiments. Applicants submit that the amendments do not further narrow the scope of the claim. The following amendment was made to claim 1: “wherein only one level of texture level is stored and used to generate the lower resolution texture array.” The claimed embodiments define the use of only one level of a mip-map to perform filtering functions. A different mip-map level is then derived and filtering functions are then executed. In this sense, the claimed embodiments include: “performing a filtering function along an axis using the texels from the higher resolution texture array **to simulate** a filtering effect of using texels from the higher resolution

texture array and a second texel array having a lower resolution” since only one level is loaded instead of two.

In alleging that the *Ewins* teaches this feature, the Office Action cites p. 318, Section 1.10 of the *Ewins* reference (“*Mip-Map Level Selection for Texture Mapping*”; IEEE Transactions on Visualization and Computer Graphics, Oct-Dec 1998). Applicants refer the Examiner to the following text within the cited text:

As illustrated in Fig. 3, the calculated minification value **will frequently fall somewhere between two prefiltered MIPmap levels. For improved results, trilinear filtering is used. Here, bilinear interpolation is performed on both levels on either side of the calculated minification value.** Trilinear interpolation is then achieved by linearly interpolating between the color values resulting from these two bilinear interpolations to the intermediate interpolation fraction f as shown. Trilinear filtering is one of the most commonly used methods of filtering in real-time hardware today. The filtering operation can be summarized as follows:

- 1) Receive the texture address s , t for the current screen pixel x , y
- 2) Calculate the texture minification, j
- 3) Extract the level of detail or MIP-map levels to be used, e.g., for a minification ratio of 6 to 1, the levels referring to minification ratios of 4 and 8 are used, i.e., MIP-map levels 2 and 3 ($l = 2$)
- 4) Calculate the trilinear interpolation fraction, f
- 5) Scale the texture address s , t for the levels selected
- 6) Perform trilinear interpolation

(*Emphasis added*; p. 318-319, Section 1.1) While the *Ewins* reference teaches of performing bilinear interpolation “on both levels on either side of the calculated minification value,” there is no mention of the following feature recited in claim 1:

“wherein only one level of texture level is stored and used to generate the lower resolution texture array.” Applicants submit that the *Ewins* reference does not teach this feature.

As a separate and independent basis for the patentability of claim 1, claim 1 further defines the feature of: “mapping a target pixel.....defined by a long and a short axis and...and a level of detail being derived from **the short axis**.” Ewins does not teach this claimed feature. Instead, Ewins (US2002/0126133) in col. 2 paragraph 23, states: “the present application methods for ...wherein the LOD parameter is based on an interpolation which is a function of both major-axis and minor-axis minification.” The Office Action further stated this point.

Fig. 1A of *Ewins* clearly shows that the interpolation is the average function $lod=f(major+minor)$. Even in Fig. 1B, LOD is a function of the major axis, but not the minor axis. A difference of the embodiments defined by claim 1 (as distinguished from Ewins - US2002/0126133) is readily observed in that the LOD of the two are different. Specifically, Ewins (US2002/0126133) does not teach or suggest the limitation of deriving LOD from the short axis only. Accordingly, and as a whole, the two Ewins combined together do not enclose all limitations of claim 1.

For at least these reasons, Applicants respectfully submit that independent claim 1 patentably defines over *Ewins* in view of *Ewins* for at least the reason that the combination fails to disclose, teach or suggest certain features in claim 1.

Dependent Claims 2-18 are Patentable

Because independent claim 1 patentably defines over *Ewins* in view of *Ewins* dependent claims 2-18 are allowable as a matter of law for at least the reason that

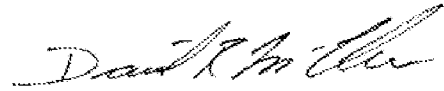
these claims contain all the features and elements of their corresponding independent claim (claim 1). See, e.g. *In re Fine*, 837 F. 2d 1071 (Fed. Cir. 1988).

CONCLUSION

Applicants respectfully submit that all pending claims are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephone conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

No fee is believed to be due in connection with this amendment and response to Office Action. If, however, any fee is believed to be due, you are hereby authorized to charge any such fee to deposit account No. 20-0778.

Respectfully submitted,



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